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10/644,010	08/20/2003	Yasuharu Hourai	107439-00091	4878

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EXAMINER
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HOANG, ANN THI

ART UNIT	PAPER NUMBER
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2836

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/644,010

Applicant(s)

HOURAI, YASUHARU

Examiner

Ann T. Hoang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/6/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The replacement drawings were received on 12 January 2006. These drawings are approved and the objection to the drawings in the previous Office action is withdrawn.

### ***Specification***

2. The amendment to the specification was received on 12 January 2006. The objection to the disclosure in the previous Office action is withdrawn.

### ***Claim Objections***

3. The amendment to claim 5 has been noted and the objection to claim 5 based on insufficient antecedent basis in the previous Office action is withdrawn.

4. Claim 4 is objected to because of the following informalities: It appears that claim 4 should be dependent on claim 2 and not claim 1. For the purposes of this action, claim 4 will be treated as being dependent on claim 2.

5. Claim 5 is objected to because of the following informalities: It appears that claim 5 should be dependent on claim 2 and not claim 1. For the purposes of this action, claim 5 will be treated as being dependent on claim 2.

6. Claim 6 is objected to because of the following informalities: It appears that claim 6 should be dependent on claim 3 and not claim 1. For the purposes of this action, claim 6 will be treated as being dependent on claim 3.

***Claim Rejections - 35 USC § 102***

7. Applicant's amendment to claim 1 has overcome the rejections under 35 U.S.C. 102(b) on claims 1 and 2 in the previous Office action. The 35 U.S.C. 102(b) rejections are withdrawn.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuhbauer et al. (US 5,933,312) in view of Murata et al. (US 5,953,198) and Hakala et al. (US 5,847,533).

Regarding claim 1, Schuhbauer et al. discloses an excitation control circuit comprising:

- a driving circuit 18 for driving a coil 1 of a solenoid;
- a counter-electromotive force absorbing circuit 3, inserted in a path of a return current of coil 1, for absorbing counter-electromotive force produced by the coil;
- a return current circuit (2, 4) connected in parallel to counter-electromotive force absorbing circuit 3; and
- a control circuit (6, 7) for outputting a signal for intermittently bypassing the return current while the return current attenuates. When driving circuit 18 is not energizing coil

1, a counter-electromotive force generated in coil 1 can be absorbed by either counter-electromotive force absorbing circuit 3, which is a non-linear resistor, or by return current circuit (2, 4), which comprises a free-wheeling diode 2 and free-wheeling transistor 4. Free-wheeling transistor 4 and counter-electromotive force absorbing circuit 3 are connected in parallel so that the counter-electromotive force current coming from coil 1 takes one path at some times, and takes the other path at other times, this being determined by the voltage in the coil. See abstract and figure. Schuhbauer et al. does not disclose that driver circuit 18 drives coil 1 in response to a pulse signal supplied from an external device, nor does the reference disclose that control circuit (6, 7) outputs a pulse signal.

However, it is common and well known in the art that driver circuits for driving coils can operate according to a pulse signal, as Murata et al. discloses a driving circuit (1, 16) for driving a coil 3 in response to a pulse signal. See abstract and Fig. 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the driving circuit of Murata et al. in the excitation control circuit of Schuhbauer et al. in order to excite the coil in a chopping manner.

Furthermore, Hakala et al. discloses motor control circuit having a pulse signal generating control circuit 46 for intermittently bypassing a return current through a return current circuit (58, 60, 62). See Fig. 1 and column 2, lines 34-36 and 48-56. Both of the return current circuits of Schuhbauer et al. and Hakala et al. include a transistor turned on by some signal from a control circuit to establish a return current path for bypassing return current. Control circuit (6, 7) of Schuhbauer et al. is a simple timing circuit

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comprising discrete circuit components. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the control circuit for outputting a pulse signal of Hakala et al. to control the bypassing of the return current through the return current circuit of Schuhbauer et al. in order to provide precise and reliable control of the operation of the return current circuit, as the control circuit of Hakala has the ability to operate on the basis of many measured and reference quantities and can be applied as a driver element to several circuit elements at a time.

Regarding claim 2, Schuhbauer et al. discloses that return current circuit (2, 4) has a first transistor 4, whose current path is connected between a positive electrode and a negative electrode of coil 1, wherein first transistor 4 is switched on according to a timing signal from control circuit (6, 7) for defining the timing of bypassing the return current. See figure and column 3, lines 13-18. The pulse signal from the control circuit 46 of Hakala et al. would on switch first transistor 4 of Schuhbauer et al. for defining the timing of bypassing the return current. See above rejection on claim 1.

Regarding claim 5, Schuhbauer et al. discloses that first transistor 4 can be any sort of switching transistor type and depicts it as a field effect transistor. See the figure and column 3, lines 29-31.

10. Claims 3, 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuhbauer et al. (US 5,933,312) in view of Murata et al. (US 5,953,198) and Hakala et al. (US 5,847,533), as applied to claims 1 and 2 above, and further in view of Oyabe et al. (US 5,811,996).

Regarding claim 3, Schuhbauer et al. discloses that counter-electromotive force absorbing circuit 3 is connected between a positive electrode and a negative electrode of coil 1, but does not disclose counter-electromotive force absorbing circuit 3 to include a transistor or a control system for switching on the transistor.

However, Oyabe et al. discloses a counter-electromotive force absorbing circuit for a coil 79 that includes a transistor 75 and a control system (75a, 75b) for switching on transistor 75 when an inter-terminal voltage of the transistor 75 in its current path exceeds a predetermined value. Transistor 75 turns on when the gate to source voltage of a drive transistor 7 exceeds a withstand voltage. The gate to source voltage of drive transistor 7 is also the source to drain voltage of transistor 75. Control system (75a, 75b) prevents inter-terminal breakdown of transistor 75. See Fig. 14; column 3, lines 50-67; and column 4, lines 1-22. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the counter-electromotive force absorbing circuit of Schuhbauer et al. with a transistor and control system, such as that disclosed by Oyabe et al., in order to improve control over the conductivity of the counter-electromotive force absorbing circuit, as well as to provide protection against inter-terminal breakdown of the counter-electromotive force absorbing circuit.

Regarding claim 4, claim 4 is rejected on the same basis as that of claim 3, wherein the second transistor of claim 4 corresponds to the transistor of claim 3. See above rejection on claim 3.

Regarding claim 6, Oyabe et al. discloses that transistor 75 is a field effect transistor and that the inter-terminal voltage of the transistor is a voltage between a source and a drain of the field effect transistor. See above rejection on claim 3.

Regarding claim 7, claim 7 is rejected on the same basis as that of claim 6, wherein the second transistor of claim 7 corresponds to the transistor of claim 6. See above rejection on claim 6.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann T. Hoang, whose telephone number is 571-272-2724. The examiner can normally be reached Monday through Friday, 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached at 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ATH  
17 April 2006

  
Brian Sircus  
SPE 2836